

anteriorly; pharyngeal teeth pavement-like. Scales small or rather small. Dorsal spines numerous, flexible.

Coasts of Australia and of New Zealand.

38. ODAX (*Odax*, sp., Cuv. & Val.). Checks and opercles scaly; snout conical, but with the upper jaw not produced. (*O. pullus*, Forsk.; *O. semifasciatus*, Cuv. & Val.; *O. radiatus* = *Malacanthus radiatus*, Q. & G. = *Cheilio lineatus*, Cuv. & Val.)
39. OLISTEROPS, Richards. Head naked. (*O. cyanomelas*, Richards.)
40. SIPHOGNATHUS, Richards. Checks and opercles scaly; snout very long; upper jaw terminating in a pointed appendage. (*S. argyrophanes*, Richards.)

XXXIX.—On the History of the 'Maté' Plant, and the different Species of *Ilex* employed in the Preparation of the 'Yerba de Maté,' or Paraguay Tea. By JOHN MIERS, F.R.S., F.L.S.&c.

[Continued from p. 228.]

The note in M. Bonpland's handwriting, accompanying the specimens sent by him, is as follows:—

- "No. 596. Herbe du Paraguay—Maté—*Ilex theæsans*, Bonpland—*Ilex Paraguayensis*, St.-Hilaire. Se trouve dans le Paraguay, le Brésil, et Entre Rios.
- "No. 2425. *Caúna* des Brésiliens—*Ilex ovalifolia*, Bonpl., nouv. espèce. Se trouve dans le Faxinal, au sortir de la Picada de S^a Cruz, à 4 lieues du Rio Pardo.
- "No. 2333. *Caúna* des Brésiliens—*Caachiriri* ou *Caachiri* des Guaranís—*Ilex amara*, Bonpl., n. esp. Se trouve dans les montagnes de S^a Cruz et dans les forêts du Paraná.
- "No. 2332. *Caúna* des Brésiliens—*Caachiriri* des Guaranís—*Ilex crepitans*, Bonpl., n. esp. Se trouve dans les bois de Guayaraça dans le cœur de S^a Cruz et sur les bords du Paraná.
- "No. 2330. *Caúna de folha larga* des Brésiliens.
- "No. 2374. *Caúna amarga* des Brésiliens.
- "No. 2479. *Caúna* des Guaranís—*Ilex gigantea*, Bonpl., n. esp. Se trouve dans les bois de S^a Cruz et sur les bords du Paraná.
- "No. 2471. *Caunina* des Brésiliens—*Ilex Humboldtiana*, Bonpl., n. esp. Se trouve dans le Picada de S^a Cruz qui conduit à Rio Pardo, Prov. Rio Grande, Brésil.

"Toutes ces espèces d'*Ilex* sont employées à faire de l'herbe Maté. Les nos. d'ordre correspondent à mon journal botanique.

"Corrientes, 17 Juin, 1857."

"AIMÉ BONPLAND."

When in Paris three years ago, I endeavoured to ascertain whether any of these specimens agreed with St.-Hilaire's typical plant; but the latter, unfortunately, had been mislaid or lost in the removal of the collections exhibited in the great 'Exposi-

tion' of 1855. St.-Hilaire states that he had compared his plant from Curitiba with specimens from Paraguay, and found them specifically identical: this conclusion does not correspond with the specimens before me.

I have since obtained from Curitiba a specimen of the plant there used in the preparation of the Herva de Paranaguá. On comparing it with the true *Ilex Paraguayensis* sent by Bonpland, I find the two sufficiently distinct, as will be seen by the diagnoses that will follow: this fact is of interest, as it accounts at once for the difference in the quality of the tea respectively prepared from these two plants.

Hitherto I have spoken only of the Yerba produced from these two species. Bonpland, however, states positively that the other species, of which he sent specimens, are also employed in the preparation of the Yerba of commerce. This fact has lately been confirmed by the assurance I have received from a Brazilian gentleman from Porto Alegre, who trades extensively in this commodity: his information is very interesting, both as regards the difference in the quality of these products, and the districts in which the trees are found; and from his knowledge of this matter and his long experience, his account may be fully depended on. The other species grow principally in the districts that stretch far to the eastward and southward of the long mountain-range which extends from the "Serra Géral" of Curitiba, in lat. 26° S., to lat. 32° S., where it is shown in the maps as the "Serra do Herval," so called from the abundance of its Maté trees. The summits of this wide-spread mountain-range are very broad, forming numerous table-lands which afford excellent pasturage for cattle. The Maté trees are never found on these table-lands, nor in the broad plains that skirt the river-beds: they grow invariably on the inclined hill-sides in the numerous gorges intersecting the country, which in most cases are densely wooded; and it is in these woods that the different species of *Ilex* abound. In some places the Maté trees attain a considerable size, often exceeding 100 feet in height. These larger trees grow especially on the declivities of the western side of the same mountain-range, where all the streams flow into the river Uruguay. The Yerba here produced is of an excellent quality: that called by the Brazilians "Herva de Palmeira" is renowned as being equal to the best Paraguay tea.

It is in this region that seven of the far-famed Missions established by the Jesuits are situated, where the Maté is extensively collected. Upon the eastern declivities, along the tributaries of the rivers Pardo and Jacuhy, are the 'Hervales' of Faxinal, Santa Cruz, and Guayaraça, to which Bonpland's specimens refer. Here also is that of Butacaray, equally renowned,

where the *Ilex gigantea* of Bonpland abounds, and where it attains a height of 70 feet: the other four kinds, with smaller and more lanceolate, punctate leaves, rarely here exceed the height of 30 or 40 feet. The latter are more irregularly branched, with a more straggling growth, and they produce the sort called by the Brazilians *Herva brava* (wild Maté), while the larger-leaved species, such as the *Ilex gigantea*, yield a kind of tea called *Herva mansa* (mild Maté); such trees have straighter trunks, with more regular and rounded heads. The former sorts have a more bitter and stronger flavour, and want the peculiar and more agreeable aroma of the Paraguay type. When, however, the *Herva brava* is mixed with the *Herva mansa* in the proportion of 1 in 3 or 1 in 4, it produces a kind of Maté which is hardly distinguishable from the genuine Paraguay Yerba; and it thus forms a considerable object of commerce.

Still further to the southward of the Serra do Herval, in the mountain districts of the Taypes or Canguassú, some species of *Ilex* abound which are said to produce a tea as valuable as the best sorts of *Herva de Palmeira*, or even vying with the Paraguay tea, being equal to them in fragrance, flavour, and strength. This fact is worthy of notice when we take into consideration the great difference in the latitude of these districts. The quality of the tea of all these various kinds depends greatly on the time of year in which the leaves are gathered, the best season for the harvest being well known to the natives.

Dr. Reisseck has lately published, in Martius's 'Flora Brasiliensis,' a Monograph of the Brazilian species of *Ilex*. He evidently had not seen any specimen of the true *Ilex Paraguayensis*; for his diagnosis under that name refers to some of the smaller, more lanceolate, and punctate-leaved species of the genus, and certainly not to the celebrated true Paraguayan plant.

I now present the characters of the several Maté plants that have been here referred to:—

1. *Ilex Paraguayensis*, St.-Hil. in Spr. Syst. iv. cur. post. p. 48; Hook. (in parte) Lond. Journ. Bot. i. 35. tab. 1;—*Ilex Paraguariensis*, St.-Hil. (in parte) Mém. Mus. ix. 351; DC. Prodr. ii. 15;—*Ilex Paraguensis*, D. Don in Lamb. Pin. App. p. 7. tab. 4;—*Ilex thezans*, Bonpl. MSS. (non Mart.);—ramulis angulato-striatis; foliis oblongis vel obovato-oblongis, coriaceis, glaberrimis, integris aut obsolete aut profundius grosse-dentatis, margine revolutis, utrinque concoloribus, nervis superne vix distinctis, subtus prominulis, reticulato-venosis, epunctatis; petiolo canaliculato; inflorescentia in axillis pluriflora; pedunculis 4–6, subfasciculatis, e nodo bracteato ortis, petiolo sublongioribus, interdum 1-floris, vel medium

versus 2-3-fidis, cum pedicellis 1-floris; floribus in ♂ 5-meris, in ♀ 4-meris, glaberrimis; sepalis parvis, rotundatis; petalis oblongis, reflexis, calyce 4-plo longioribus; drupa glabra, piperiformi; nucibus 5, singulis stria mediana prominula carinatis.—Paraguay; in Brasilia australi introducta.

Type *α*.—In the typical specimen sent to me by Bonpland as the real Paraguay species, the leaves are very entire, or sometimes with only a slight indication of distant teeth near their summit; they are quite opaque above, nearly concolorous: the upper surface is smooth and almost nerveless; but the nerves, when present, are slender and prominent beneath. They are $3\frac{3}{4}$ inches long, $1\frac{3}{4}$ inch broad, on a petiole 3 lines long: about four very slender fasciculated peduncles issue from an axillary stipitiform nodule, each bearing three one-flowered pedicels: the peduncle measures 3 lines, the pedicels 2 lines, with a globular flower-bud 1 line in diameter: sometimes one or two of these pedicels are wanting, in which case the peduncle is 5 lines long and 1-flowered. The specimen was collected at Candelaria, in the province of Corrientes, "in a wood planted by the Jesuits."—*Herb. Bonpl.* no. 596*.

Var. *β. idonea*;—foliis crassioribus, rachi subtus crassiori.

In this variety (sent with the preceding, without any locality) the leaves are thicker and obsoletely dentated all round their margin, which is revolute; above, the nervures are distinct and the midrib is thicker; the blade is $3\frac{1}{4}$ inches long, $1\frac{1}{4}$ inch broad, on a petiole of 5 lines. The specimen is without flower or fruit †.

Var. *γ. dentata*, nob.;—foliis e medio usque ad petiolum cuneatis, grosse dentatis, dentibus obtusis glandula minima donatis; fructibus piperis magnitudine.

The leaves are here more deeply and obtusely toothed for two-thirds of their length, the lower portion being quite cuneiform and entire; they are somewhat shining above, very smooth, with immersed nervures; the lower face is opaque, with prominent fine nervures, the midrib being much raised; they are 3 inches long, $1\frac{1}{2}$ inch broad, on a petiole of 5 lines. The specimen is in fruit; the pedicels are fasciculated on a short nodule, and are either 1- or 3-flowered and 5 lines long; the drupe, seated on a 4-lobed calyx, is globular, 2 lin. diam., crowned with a thin, flat, sessile, 4-lobed stigma. The plant is probably from one of the old Jesuit plantations on the Uruguay ‡.

* A drawing of this plant is given in Plate 61 A of the 'Contributions.'

† A sketch of this variety will be seen in Plate 61 B.

‡ An outline of this variety will be seen in Plate 62 A.

Var. *δ. usitata*, nob.;—foliis e medio ad basin cuneatis, breviter et remote dentatis, dentibus glandula mucronulatis, margine paulo reflexis; corymbo petiolo 2-plo longiore, e basi ramoso, ramis 3-4-floris, pedicellis longiusculis, tenuissimis, umbellato-fasciculatis, imo bracteolatis; floribus 4-meris, glaberrimis, parvulis; drupa piperiformi.—Prov. San Páolo (Gaudichaud, no. 57).—An species distincta?

The leaves are 3-3½ inches long, 1¾ inch broad, on a petiole of 5 lines; they are more finely toothed than the preceding: the primary branch of the axillary corymb is 2 lines long, the five or six fasciculated branchlets 3 lines, and the three pedicels at the extremity of each 2 lines long; the expanded flower is 2 lin. diam. Both the ovary and ripe fruit are crowned with a flat sessile stigma, as in the Paraguayan species; the drupe is globular, and nearly 3 lines in diameter*.

2. *Ilex Curitibensis*, nob.;—*Ilex Paraguariensis*, *St.-Hil.* (in parte) *Mém. Mus.* ix. 351; *Voy. Diam.* i. 273; *DC. Prodr.* ii. 15;—*Ilex Maté*, *St.-Hil. Pl. Remarq.* i. 41;—glaberrima, ramulis teretibus, angulato-striatis, fuscis, lenticellis notatis, junioribus subcompressis, acute 4-6-gonis; foliis elliptico-oblongis, imo cuneatis, apice breviter et repente acuminatis, acumine obtuso aut emarginato, grosse dentatis, dentibus paucis obtusis valde gibbis et apice glandula mucronatis, subcoriaceis, rigidulis, supra fusciscentibus, nitidis, costa nervisque omnino immersis, subtus pallidioribus, subferrugineis, opacis, epunctatis; petiolo longiusculo, canaliculato; floribus ♀ paucis, in axillis fasciculatis, 4-meris; drupa ovata, stigmatate pulvinato 4-lobo coronata, nucibus 4.—Prov. San Páolo, v. s. ex sylvis prope Curitíba; etiam in hb. *Delessert*, Sorocába (Sellow).

This must be the plant collected by St.-Hilaire at Curitíba, and considered by him to be identical with the Paraguay species, which he does not appear to have seen; the two plants, however, are manifestly different. Here the branchlets are very angularly sulcated, shining, and, as well as the leaves, grow nearly black in drying; the leaves are more distinctly cuneate, the dentations are fewer in number, and consequently larger, deeper, very obliquely rounded, each tooth having near its sinus a short acute mucronate gland; the opacity on the lower side is caused by the presence of very minute and crowded granulations, which are very manifest under a lens: they have no immersed black glands, as in Reisseck's second section of the genus; the midrib is somewhat prominent below, polished, and very dark. The

* This variety is shown in Plate 62 B of the 'Contributions.'

leaves are 3-4 inches long, $1\frac{1}{2}$ -2 inches broad, on a petiole 6 lines long: the drupe is oval, $2\frac{1}{2}$ lines long, 2 lines diam., supported on a 4-lobed calyx, and crowned with a prominent, pulviniform, 4-lobed stigma; it encloses four nuts*.

Var. *Gardneriana*, nob.;—*Ilex Paraguayensis*, Hook. (*in parte*) *Lond. Journ. Bot.* i. 35. tab. 1;—ramulis opacioribus, foliis non fuscescentibus, coriaceis, supra nervis venisque reticulatis subconspicuis, ad costam profunde sulcatis, subtus pallidioribus. An species distincta?—Prov. Rio de Janeiro in Montibus Organensibus (Gardner, no. 346), *v. v.*

This plant is well represented by Sir Wm. Hooker, in the drawing above cited, under the name of *Ilex Paraguayensis*, var. *a.* It is a small tree, about 15 feet in height: its leaves are $2\frac{1}{2}$ -3 inches long, 15-18 lines broad, on a nearly terete slender fuscous petiole 5-6 lines long; their margin is much reflexed, with a very acute uncinat gland on the apex of each tooth, close to the sinus: the under side, viewed through a lens, presents a similar minutely granulated surface, and is quite epunctate. My specimen has no fruit; but that in the Hookerian herbarium had a single drupe, which is of a globular form, $2\frac{1}{2}$ lines diam., crowned with a depressed, pulvinate, 4-lobed stigma, as shown in the plate referred to.

3. *Ilex gigantea*, Bonpl. MSS., n. sp.;—arbor excelsa, glaberrima, ramulis subrugosis, junioribus angulatis, lenticellatis; foliis cuneato-oblongis vel obovatis, apice rotundatis vel retusis, hinc brevissime acutis aut mucronatis, integerrimis, margine incrassato valde revoluta, crasso-coriaceis, supra nitidulis, costa nervisque omnino immersis, subtus glauco-ferrugineis, epunctatis, nervis gracillimis paulo prominulis; petiolo crassiusculo, canaliculato; racemulis ♀ axillaribus, e basi 3-4-floris, petiolo dimidio brevioribus; drupis globosis, lævibus, piperis magnitudine, stigmatē majusculo mammæformi 4-lobo prominente coronatis; nucibus 4.—In sylvis ad S^a Cruz, prov. Rio Grande, et ad ripas fl. Parana, Prov. Entrerios.—Bonpland, nos. 2330, 2374, et 2479.

This is certainly a very distinct species, apparently allied to *I. integerrima*, Reiss. It forms a very lofty tree, with a copious rounded head; its leaves are very thick, coriaceous, very smooth, nerveless and polished above, with entire, very rounded and revolute thick margins, cuneate at base, very opaque beneath, with inconspicuous nervures; they are 3 inches long, $1\frac{3}{8}$ - $1\frac{1}{2}$ inch broad, on a thick, broad, and somewhat marginated petiole 5 lin. long; the pedicels of the fruit are barely 3 lines long;

* This plant is represented in Plate 63 of the 'Contributions.'

the drupe is 3 lin. diam., with a prominent mammiform and obsoletely 4-lobed stigma. In another specimen the leaves are more polished, extremely smooth above, the margin showing a disposition to become toothed; they are pale brown above and fuscous brown beneath, the petiole being thinner and 3-carinated below*.

4. *Ilex amara*, Bonpl. MSS.;—ramulis rubellis, glaberrimis, striato-angulatis; foliis lanceolatis, imo longe cuneatis, versus apicem cuneatis, et hinc obtusiusculis et emarginatis, ultra medium integerrimis, hinc inde serratis, dentibus extus rotundatis, apice glanduliferis, margine vix revoluta, glaberrimis, crassiusculis, superne nitidis, pallide viridibus, nervis costaque mediana rubella immersis, subtus flavo-opacis, epunctatis, nervis tenuissimis, anastomosantibus, inconspicuis; petiolo flavo, angusto, canaliculato.—In sylvis circa Missiones, ad ripas fluvii Paranensis, et ad montem Santa Cruz in prov. Rio Grande.

This is a still more distinct species, with lanceolate leaves, which are cuneate and entire for two-thirds of their length, their summit being shortly attenuated and emarginated; above, they are opaque and very smooth, almost nerveless, with a reddish flat midrib; they are pale green, somewhat paler and yellowish below, where their delicate nervures are scarcely prominent, and their midrib, of an orange-red colour, is not much raised. They are $2\frac{1}{4}$ – $2\frac{1}{2}$ inches long, $\frac{3}{4}$ inch broad, on a petiole 4 lines long. The specimen has neither flower nor fruit. In form the leaves somewhat resemble those of *I. nigropunctata*, but they want the peculiar dotted glands so conspicuous in that species†.

5. *Ilex Humboldtiana*, Bonpl. MSS. (stirps ♂);—*Ilex crepitans*, Bonpl. MSS. (stirps ♀);—*Ilex Paraguariensis*, Reiss. (non *St.-Hil.*), var. *angustifolia*, *Flor. Bras.* xxviii. p. 63. tab. 13. fig. 17;—glaberrima, ramulis rugulosis, subangulatis; foliis confertis, lanceolatis, utrinque gradatim attenuatis, summo anguste obtusis, crassiusculis, obsolete dentatis, dentibus glanduliferis, superne nitidis, olivaceo-viridibus vel atrovirentibus, lævissimis, fere enerviis, ad costam profunde sulcatis, subtus flavescensibus aut pallide ferrugineis, nervulis subpatentibus paulo prominulis inter se arcuatim nexis, hinc remote nigro-punctulatis; petiolo tenui, canaliculato; paniculis axillaribus, e basi ramis 3–6, fasciculatis, ramis 3-floris, floribus 4-meris, glaberrimis; drupis parvis, globosis, stigmatate mammæformi sub-4-lobo coronatis, nucibus 3–4.—In

* This species is represented in Plate 64 A of the 'Contributions.'

† A drawing of this species will be seen in Plate 64 B.

montibus Guayaraça et Santa Cruz, versus Rio Pardo, in prov. Rio Grande, et in Missionibus, versus fluv. Paraná, in prov. Corrientes (Bonpland, nos. 2449, 2471, 2332).

The above two species of Bonpland appear to me identical, there being no difference, except that the one is the male plant, with somewhat paler leaves, the other being the female plant, with less elongated and extremely dark leaves. It is evidently one of the varieties of Reisseck's *Ilex Paraguariensis*, but it bears no analogy whatever with the Paraguay type. It is one of the most esteemed kinds of Maté trees, and the tea yielded by it is so strong in flavour as to require tempering by admixture with others of a milder kind. The leaves are very much smaller than any of the preceding species, are attenuated at both ends, above are of a dark green (in the ♀ blackish green), polished, veinless, and deeply channelled at the place of the midrib; beneath, in the ♂, glaucous, in the ♀ of a yellowish hue, opaque, owing to a minutely granulated surface, which is remotely spotted with small, immersed, black glands. In the ♂ the leaves are $1\frac{1}{2}$ – $1\frac{3}{4}$ inch long, $\frac{1}{2}$ inch broad, on a petiole of $3\frac{1}{2}$ lines; in the ♀ they are 2– $2\frac{1}{2}$ inches long, 5–8 lines broad, on a petiole of $2\frac{1}{2}$ –3 lines. The flowers are numerous in the axils of the younger branches, in a short fasciculated branching corymb, the basal ramifications being slender, $2\frac{1}{2}$ lines long, each bearing three small flowers on pedicels 2 lines long; the four petals are three times as large as the sepals, orbicular, concave, glabrous, white, the flower expanded being 2 lines in diameter: in the ♂ the sterile ovary is depressed, broadly 8-rayed in the summit, with a small sessile 4-lobed stigma in the centre: in the ♀ the drupe is globular, $1\frac{1}{2}$ line diam., crowned with a prominent mammiform sessile stigma; it encloses three or four nuts*.

6. *Ilex ovalifolia*, Bonpl. MSS.;—*Ilex Paraguariensis*, Reiss. (non St.-Hil.) in *Mart. Flor. Bras.* xxviii. p. 63, var. *longifolia*, tab. 13. fig. 16;—*Ilex Paraguariensis*, Spach, *Phan.* ii. 430. pl. 16;—glaberrima, ramulis angulato-striatis; foliis ellipticis vel elliptico-oblongis, utrinque acutis, apice breviter coarctato et obtuso, coriaceis, rigidulis, glaberrimis, obsolete dentatis, dentibus glandula minuta donatis, margine cartilagineo subreflexo, superne nitidulis, profunde viridibus vel brunnescentibus, nervis immersis vix distinctis, ad costam sulcatis, subtus opacis, pallide glaucis aut flavescentibus, remote nigro-punctulatis, costa valde prominente, nervis subpatentibus inter se arcuatis paulo prominulis; petiolo sulcato,

* A representation of this plant is shown in Plate 65 A of the 'Contributions.'

sublongiusculo, sæpius recurvo; paniculis axillaribus, multifloris, petiolo 2-plo longioribus, sub lente obsolete puberulis, demum subglabris; floribus 4- rarius 5-meris, petalis oblongis, patentibus; ovario stigmatate magno mammæformi 4-lobo sessili apiculato; drupa globosa, stigmatate mammillari coronata.—In prov. Rio Grande, ad Faxinal, et versus Rio Pardo (Bonpland, no. 2425) ♀; *ex herb. Delessert*, Rio de Janeiro (cult.?), A. Richard (♂).

This species is very nearly allied to the preceding, and appears to be one of the varieties which Dr. Reisseck has mistaken for the true Paraguay Maté-tree. In the specimen collected near Rio de Janeiro, which seems to be the male plant (appertaining to the female, Bonpland, no. 2425), the leaves are much darker and more polished; they are $1\frac{1}{2}$ – $1\frac{3}{4}$ inch long, 8–9 lines broad, on a petiole 3 lines in length: the inflorescence is a branching corymb, 6–9 lines long, with lateral racemose branchlets, each bearing three pedicelled small 4-merous flowers; the sepals and petals have ciliated margins; the sterile ovary has a flat depressed 8-grooved summit, with an obsolete 4-lobed stigma. In Bonpland's female plant the leaves are similar in size and shape, but are much paler above and more glaucous below: its inflorescence is an axillary panicle, 6–12 lines long, with several pedicels, which are either 1- or 3-flowered; if 1-flowered, the pedicel is 2-bracteated below the middle, showing the point where the two abortive flowers would have been inserted: these 1-flowered pedicels are 2–3 lines long; in the 3-flowered ramifications the ultimate pedicels are 1–2 lines long. This female flower is much larger than that of the male, and when expanded is 2 lines in diameter; it is generally 4-, sometimes 5-merous, the sepals and petals having ciliated margins; the ovary is somewhat oval, surmounted by a large, mammiform, sessile, 4-grooved stigma*.

The two following species have been referred by botanists to the true Maté plant:—

7. *Ilex nigropunctata*, nob.;—*Ilex Paraguayensis*, var. γ , Hook. (non St.-Hil.) in *Lond. Journ. Bot.* i. 35. tab. 3. plant. ♂;—*Chomelia amara*, Vell. *Flor. Flum.* 42. *Icon.* i. 106. plant. ♀;—ramulis sulcatis; foliis oblongis aut oblongo-lanceolatis, utrinque attenuatis, apice obtusiusculis, obsolete dentatis, dentibus glanduliferis, margine subrevoluto, superne pallide viridibus, nitidiusculis, ad costam sulcatis, utrinque nervosis et reticulato-venosis, subtus (in sicco) flavido-vel glauco-viridibus et nigro-punctulatis, costa prominente; petiolo tenui, canalicu-

* A drawing of this species is given in Plate 65 B of the 'Contributions.'

lato; racemis axillaribus, multifloris, ternatim compositis, petiolo 2-4-plo longioribus; floribus 4-meris pedicellisque pilosulis; ovario in ♂ depresso, radiatim sulcato, in ♀ ovato; stigmatibus pulvinato, 4-lobis.—Brasilia, ad Campos de Goitacazes, versus ostium fluv. Parahyba, prov. Rio de Janeiro.—*v. v.* ad Rio de Janeiro, in hort. bot. Imp. cult. (♂ et ♀), et in hort. Kew. Lond. introduct. (♂).—*v. s.* in herb. Delessert (Guillemin, no. 95 ♀).

This has always appeared to me a perfectly distinct species, differing widely in all respects from *Ilex Paraguayensis*, of which it was considered to be a mere variety by Sir Wm. Hooker. I find no species in Reisseck's enumeration of the genus that corresponds with it: he appears, however, to have known this plant only from Sir Wm. Hooker's drawing of it, and he makes it identical with *Ilex affinis*, Gardn. (no. 3086). It is clear to me that, if he had been able to compare these plants with one another, he would have come to a very different conclusion. In the male plant under consideration, the leaves, sometimes alternate, frequently opposite, are lanceolately oblong, pointed towards both extremities, pale on both faces, very reticulated, toothed on the margin at nearly equal distances, the teeth being rounded externally, with an acute gland near the sinus; the under surface of the leaves is spotted all over with very distinct black dots. They are $3\frac{3}{4}$ inches long, $1\frac{1}{8}$ inch broad, on a petiole nearly 4 lines in length. The inflorescence is a simple panicle, $\frac{3}{4}$ – $1\frac{1}{2}$ inch long, with alternate secondary pedicels $1\frac{1}{2}$ line long, each surmounted by three pedicellets 1 line long, bearing flowers which before bursting are globular, and 1 line diam.; the flowers are 4-merous, the calyx pubescent, the petals have ciliated margins, the ovary is depressed and radiately sulcate, with a small 4-lobed stigma. In the female plant the leaves are of similar form, but somewhat smaller, fuscous and enervose above, more rigid in texture, the margins more reflexed, and the under surface opaque and of a dull yellow colour: the inflorescence is more racemose, bearing 3–5 or 7 flowers, which are somewhat larger and 4-merous; the sepals are small, orbicular, and ciliated, the petals obovate and smooth, the ovary globular, with a small mammi-form 4-grooved stigma. Padre Velloz, who has figured the female plant, says it is called *Congonha*, and is used as Maté; but it is more bitter than the ordinary Herva de Curitiba*.

8. *Ilex acutangula*, Neuw. ex Nees in Flor. 1821, p. 329;—*Ilex Paraguayensis*, Hook. (non St.-Hil.) Bot. Mag. 3992;—*Celastrus 4-angulatus*, Schrad. Gött. Anz. 1821, p. 716; DC.

* The male plant is shown in Plate 66 A, the female plant in Plate 66 B of the 'Contributions.'

Prodr. ii. 7;—ramulis 4-angulatis, rubescentibus; foliis suboppositis, ellipticis, imo subacutis, versus apicem rotundioribus, hinc acumine brevi repente coarctato, recurvatim canaliculatis, irregulariter serratis, dentibus acutis, glanduliferis, supra lucidis, subtus pallidioribus, epunctatis, nervis utrinque paulo prominulis; petiolo brevi, canaliculato; racemis axillaribus, paniculatis; pedicellis plurimis, subumbellatis; calyce pubescente; drupis siccis, sub-8-sulcatis.—Brasilia, v. v. in hort. Kew. cult. sub nom. "*Ilex Paraguayensis*."

This is the species described by Sir Wm. Hooker as the Paraguay Tea-tree, which he figured in the 'Botanical Magazine,' as then growing in Glasgow, where it first flowered in June 1842, having been introduced into this country by Messrs. Lucomb and Pince of Exeter; he again mentioned it in his interesting account of the Maté plant (Lond. Journ. Bot. i. 31). It is distinguished from all the preceding species by its quadrangular stems, its opposite serrated leaves (a character of frequent occurrence in the preceding species), the teeth being very close and regular, and furnished with glandular points which are almost spinous: the recurved and suddenly contracted apex of the leaves affords an additional character. In all its essential features it corresponds with the species above quoted and described in Prince Maximilian Neuwied's 'Travels.' It is certainly allied to the true *Ilex Paraguayensis*, which it resembles in the size of its leaves; but it differs widely in its specific characters: its leaves are less rigid and coriaceous, differently nerved, their margins being closely serrated, the petiole is more terete, and the inflorescence is very different. Both species, having epunctate leaves, belong to the first section of Reisseck's distribution. The leaves are $3\frac{1}{2}$ inches long, 2 inches broad, on a petiole 3 lines in length; their short sharp serratures are 1 or 2 lines distant from one another. I have not seen it in flower, the above floral characters being taken from the figure in the 'Botanical Magazine.' The raceme, as there shown, differs from that of the many preceding species in its primary branches bearing several umbellate pedicels and a cluster of flowers.

The *Ilex truncata* of Prince Neuwied, recorded at the same time, appears to be a closely allied plant: it is the *Celastrus ilicifolius* of Schrader, mentioned in DeCandolle's 'Prodromus,' ii. p. 7.

Allied to these plants is the following species, which I found in the Organ Mountains, and which has been described by Dr. Reisseck under the name of

Ilex ebenacea, Reiss. in Mart. Flor. Bras. fasc. 28. p. 44.

tab. 11. f. 7.—*v. v.* in *Montibus Organensibus*, Prov. Rio de Janeiro.

The description above cited is that of the male plant; but the plant found by me had hermaphrodite flowers and fruit. In this the leaves are alternate, sometimes opposite, rarely ternate, very coriaceous, with immersed nerves, which are scarcely prominent below: the upper surface is convex, sub-polished, with cartilaginous margins, which are very revolute; the midrib is immersed and sulcate above, prominent below; the lower surface of the leaves is paler and opaque, being densely covered with very minute, whitish, punctate scales, seen only under the lens: they want the larger black dots found in the preceding species. The leaves are $2\frac{1}{4}$ – $2\frac{1}{2}$ inches long, 10–11 lines broad, on a somewhat slender petiole 6–9 lines long. The inflorescence ♂ is axillary, consisting of 2–5 fasciculated 1-flowered peduncles 2–3 lines long: the calyx is 5-toothed; the five petals are oblong, obtuse, rotately expanded, 3 lines long, $1\frac{1}{2}$ line broad, slightly coalescent at their base by the adhesion of the alternate filaments, which are as long as the petals, and in like manner expanded: the ovary is oval, 5-celled, each cell having one suspended ovule: the stigma is broadly mammiform and sub-5-lobed: the drupe is oval, purplish red, fleshy, 5–7 lines long, 4–6 lines diam., crowned with a large conical stigma, and containing five osseous grooved nuts, each 1-seeded: the embryo is minute, near the summit of the albumen.

It is probable that the *Ilex rivularis*, Gardn., and *I. affinis*, Gardn., both from the province of Goyaz, are theiniferous. Dr. Reisseck considers the one to be a mere variety of the other; but they appear to me sufficiently distinct. In the former the leaves are much broader, stouter, with a more revolute and thicker cartilaginous margin; the nerves are fewer, coarser, more distant and more divaricated; the petiole is shorter and broader. In the latter the racemes are more elongated, more spicated, and the pedicels much longer; the flowers are nearly half the size of the former, with a glabrous (not a pubescent) calyx. These differences cannot be sexual, for in both my specimens the flowers are ♀ and 4-merous.

All the above species, excepting the last-mentioned, are extra-tropical, or scarcely reach the limit of the southern solstice, and they all appear to contain the peculiar principle (*theine*) which exists in Chinese tea and in coffee. The Yerba de Paraguay, like coffee, owes its refreshing qualities not only to the presence of theine, but to a peculiar acid. Dr. Stenhouse found 2 per cent. of theine in Congou tea, and 0.75 to 1 per cent. of the same principle in coffee—called also *caffeine*, both having been

found to be identical. The quantity existing in the Yerba de Paraguay has not been ascertained, but it is probably not less in amount than in coffee. Coffee, however, derives its pleasant flavour principally from its peculiar acid, called caffeic acid, which is very analogous to kinic acid, or the vegetable acid of Cinchona-barks. Dr. Stenhouse relates that when caffeic acid is treated with sulphuric acid and binoxide of manganese, it yields the peculiar principle called *kinone*, and that the Paraguay tea also furnishes kinone when subjected to a similar treatment. It is worthy of notice that the leaves of our common Holly, when exposed to the action of the same reagents, also yield kinone, as do the whole of the Cinchona tribe of plants and Asiatic Tea. There is another vegetable product of an analogous nature, the *guaraná*, or inspissated juice of the *Paullinia sorbilis*, prepared by the Indians of Pará, the infusion of which affords a very refreshing drink, of which the Indians are very fond. This has been analysed by Dr. Stenhouse, and found to contain a large proportion of theine. It is singular that Man, in the lowest grades of civilization, should have had the faculty of distinguishing and applying to his use those plants which contain the peculiar principle to which the tea of China owes its invigorating property.

XL.—On a supposed new Genus and on some new Species of Pelagic Mollusca. By ARTHUR ADAMS, F.L.S. &c.

As the little floating forms of Mollusca which inhabit the high seas are so little known and so seldom met with, I consider it interesting to the zoologist that the capture of every novel example should be recorded, even supposing the presumed "new genus" should hereafter be proved to be merely a synonym of some well-known type. Thus *Zoea* of Leach led the way to Thompson's revelations of the metamorphoses of the Crustacea, and *Cirrhopteron* of Sars to those of the Mollusca. *Sinusigera* of D'Orbigny has been said to be the larva of *Dolium*, the nucleus of which, however, is smooth and tumid, and the outer lip thin and simple. The same species, *S. cancellata*, has also been supposed by Macdonald to be the young of a very different shell, namely *Pedicularia*. The nearest approach to the small shells described below is *Sinusigera*; but if they be the fry or embryonic condition of some other mollusk, I cannot imagine to what known genus they can be affiliated.

Genus *ALCIOPE*, A. Adams.

Testa dextrorsa, spiralis, trochiformis; anfractuultimo ad peripheriam